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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,734	04/26/2007	Olav Ellingsen	09663.0080USWO	5502
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EXAMINER				
SINGH, PREM C				
ART UNIT		PAPER NUMBER		
1797				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/597,734

**Applicant(s)**

ELLINGSEN, OLAV

**Examiner**

PREM C. SINGH

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- \_\_\_\_\_ Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)
- \_\_\_\_\_ Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Amendment to claims 1-16 is noted.
2. Objection to claims 1-16 is withdrawn.
3. Rejection of claim 12 under 35 U.S.C. 112, first paragraph, is withdrawn.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

- The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellingsen (WO 00/47695; equivalent US Patent 6,660,158; hereafter, all the references will correspond to the US Patent).

6. With respect to claim 1, Ellingsen discloses a cracking process wherein cracking is carried out in a cyclone reactor and in a riser with varying diameter [b] under the influence of a rotating and turbulent fluidized energy carrier in the form of fine grained minerals, whereby the particles are put in motion [c] from the regenerator through two exit lines with outlet under the level of the fluidized bed and are transported to the riser by combustion gases in the fluidization reactor (See figure 1; column 5, lines 60-67; column 6, lines 13-61).

Ellingsen invention does not specifically disclose the regenerator temperature, however, the invention does disclose cracking temperature of 350 and 400°C (See column 7, lines 49-52; column 8, lines 1-3). Since regenerator uses oxygen to combust coke deposited on the catalyst particles, its temperature is higher than the temperature in the cracking reactor. Thus, it would have been obvious to one skilled in the art at the time of invention to modify Ellingsen invention and specify regenerator temperature for proper control and regeneration of spent catalyst.

7. With respect to claim 2, Ellingsen discloses that the energy carrier is selected from silica sand, alumina silicate or other fine-grained catalytic materials (See column 6, lines 49-51).

8. With respect to claim 3, Ellingsen discloses that the reactor cyclone [d] has an entrance which is diverting the flow of catalyst and gases whereby they will be subject to strong mechanical shear forces and where the catalyst may be evacuated from the reactor cyclone and be discharged to a regenerator [j] via a rotating valve system [i] (See figure 1; column 6, lines 13-61).

9. With respect to claims 4, 5 and 13, Ellingsen discloses that the deactivated energy carrier is regenerated in a fluidized regeneration chamber [j] receiving combustion gases or air and the energy carrier is regenerated by oxidizing accumulated coke (See figure 1; column 6, lines 49-67; column 7, line 1). Ellingsen also discloses that the regenerator comprises a heat exchanger [i] where the oil charge is preheated by the fluidizing effluents leaving the regenerator [j] (See figure 1 and column 6, lines 40-42). Ellingsen invention also discloses that the bottom of the regenerator has a fluidizer [m] (See figure 1), which is similar to the claimed fluidizing perforated plate above a plenum in the regenerator.

Although Ellingsen invention does not specifically disclose steam generation in the heat exchanger, it is known to those skilled in the art that the hot stream from the regenerator will preheat the feed and also generate steam in a typical process.

10. With respect to claims 6 and 14-16, Ellingsen discloses that the regenerated energy carrier is transported pneumatically by all or part of the stream of combustion gases (See column 4, lines 45-46; column 6, lines 57-61).

11. With respect to claim 7, Ellingsen discloses that the coke which is oxidized on the energy carrier substantially supplies the energy for the operation (See column 6, lines 37-39, 64-67; column 7, line 1; column 8, lines 32-36).

12. With respect to claim 8, Ellingsen discloses that the product gases are passed to a suitable condensing system consisting of a condenser [r] and [s] or a conventional distillation column (See figure 1 and column 7, lines 3-6).

13. With respect to claim 9, Ellingsen discloses that the feed oil is preheated by the heat of condensation of the gases and that the oil is atomized in a nozzle where it is mixed in atomized state with the gas stream delivered by [e] (See column 6, lines 40-45).

Although Ellingsen invention does not specifically disclose the details of working mechanism of a nozzle, however, it is well within the art to use steam to convert the oil stream into droplets in any standard nozzle design, including as claimed.

14. With respect to claim 10, Ellingsen discloses a cracking unit comprising a cyclone reactor and a riser of varying diameter [b], whereby the inlet of the cyclone reactor is provided in the lower part of the reactor, in order to bring the particles into an upward circulating movement with large shear and centrifugal forces, a perforated fluidizing plate situated approximately half a diameter from the bottom of the regenerator [j] over a plenum for the regeneration of the energy carrier, as well as a heat exchanger [i], provided in the fluidized bed of the particles in the regenerator, in order to control the temperature (See figure 1; column 6, lines 1-61).

15. With respect to claims 11 and 12, Ellingsen invention does not specifically disclose acceleration and retardation of gas and particulate energy carriers and optimization of the collisions between the particles and the oil drops injected in the riser and thereby optimization of the energy transfer and mechanical collision forces between the particles and the oil droplets, however, the invention does disclose similar cracking unit as claimed by the Applicant, including varying diameter of the riser, and therefore, it is expected that the claimed acceleration, retardation and optimization should necessarily be achieved in Ellingsen's cracking unit also.

Ellingsen invention does not specifically disclose the sonoluminescence claimed by the Applicant, however, the invention does use similar cracking unit, feedstock, and operating conditions as claimed by the Applicant. Thus, it is expected that Ellingsen

cracking unit should necessarily be achieving the similar sonoluminescence effect resulting in the hydrogenation of oil, as claimed by the Applicant.

### ***Response to Arguments***

16. Applicant's arguments filed 02/26/2009 have been fully considered but they are not persuasive.

17. In the arguments on page 9/12 (paragraph 4-5), the Applicant argues that in the present invention cracking takes place in the riser of varying cross section (Fig. 1, [F]) which is attached to a cyclone (Fig.1, [N]). In Ellingsen the riser (Fig. 1, [O]) is simply used to pneumatically suck off the regenerated catalyst from the regenerator. Ellingsen does not have a riser with varying cross section. Contrary to all fluidizing catalytic processes according to the prior art, the present cracking process can use neutral pulverized particles such as sand as energy carriers.

The Applicant's argument is not persuasive because Applicant's figure 1 and Ellingsen's figure 1, both have risers ([F] and [O], respectively) with uniform diameter. It is only the cyclone part of the reactor which has variable diameter in both cases. The risers in both are attached with "reactor cyclones" ([N] and [a], respectively). The only difference is that the oil feed is delivered to the riser in the claimed invention and to the reactor part of cyclone in Ellingsen. However, Ellingsen discloses, "The reactor can have any other suitable design which can apply to the invention" Column 7, lines 32-33);



and also, "FCCU processes are widely utilized in the petroleum industry.....feed and recycle are introduced into this hot catalyst stream en route to the reactor. Much of the cracking occurs in the dispersed catalyst phase along this transfer line or riser" (Column 1, lines 18-31). Thus, it would have been obvious to one skilled in the art to modify Ellingsen invention and take the feed in the riser to contact the hot catalyst en route to the reactor as suggested by Ellingsen invention. Ellingsen also discloses that the energy carrier is selected from silica sand, alumina silicate or other fine-grained catalytic materials (See column 6, lines 49-51).

18. In the arguments on page 10 and 11 (paragraph 1-3), the Applicant describes the details of the invention and mechanism of formation of "hot spots" which are not part of the claims.

19. In the argument on page 11/12 (paragraph 4), the Applicant argues that Ellingsen does not teach or suggest a varied diameter riser for cracking oil of the present invention.

The Applicant's argument is not persuasive because, as discussed earlier, it is not the riser with variable diameter (See Applicant's figure 1 [F] and Ellingsen's figure 1 [O]), it is the "reactor part of cyclone" which has a variable diameter and disclosed by Ellingsen (See figure 1).

20. In conclusion, the claimed invention is *prima facie* obvious over Ellingsen.

***Conclusion***

21. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS 040709

/Glenn A Caldarola/  
Acting SPE of Art Unit 1797

